IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant	:	Krodel et al.	On Appeal to the Board of Appeals and Interferences
Serial No.	:	09/725,428	
Filed	:	November 29, 2000	Examiner: Ngoc-Yen Nguyen
For	:	METHOD FOR PURIFYING PROCESS WASTE GASES	Art Unit: 1754

BRIEF ON APPEAL

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January 8 2004
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I. REAL PARTY IN INTEREST

This application has been assigned by the inventors Gunter Krodel, Lutz Fabian and Volkmar Hopfe to Centrotherm Elektrische Anlagen GMBH & Co., who is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

The applicant and the applicant's legal representatives are unaware of any appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-13 have been rejected under 35 U.S.C. §103(a) as obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.). No claims are allowed. Appellant appeals from the Final Rejection of pending claims 1-13, which are set forth in the Appendix to this brief.

IV. STATUS OF AMENDMENTS

No new amendments have been requested.

V. SUMMARY OF INVENTION

Applicant's invention relates to a method for purifying process waste gases by introducing the waste gas into a reaction chamber and post-treating the reaction products leaving the reaction chamber in a washing or sorbtion chamber with an associated washing agent circuit. The specific types and amounts of harmful substances in the process waste gas are continuously measured, with a first detector, before the waste gases enter the reaction chamber and also when the reaction products leave the system, with a second detector. The signals measured can then be provided to a computer and are used directly to regulate the operating parameters of the waste gas purification system.

Since the composition of process waste gases are generally known when the gases come from only one process, the method parameters can usually be determined by empirical values or stoichiometric calculation. However, when successively or simultaneously purifying process waste gases from a variety of processes or process waste gases of highly variable composition, as in the present invention, considerable difficulties occur in determining the necessary method parameters. According to the present invention, upon detection of at least one selected harmful substance by a first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to, e.g., the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent. In particular, the operating parameters are preset by a self-learning algorithm in the computer on the basis of comparatively determined waste gas species and concentrations of harmful substances. The operating parameters of the waste gas purification system are then

adjusted as a function of the measured values of a second detector so that the concentration of selected harmful substances at the exit of the waste gas purification system is minimized. For example, if the second detector measures an elevated concentration of HF then the pH and/or the amount of the washing agent may be increased. On the other hand, if an elevated concentration of combustible/oxidizable or thermally decomposable harmful substance is detected by the second detector, the amount of combustible gas and/or the amount of oxygen supplied is increased.

Therefore, the present invention provides a method for purifying process waste gases from a variety of processes or from processes containing highly variable composition. Gas analyses of all components of the waste gas are calculated from a spectrum of selected harmful substances and multiple operating parameters may be adjusted accordingly. In addition, measurement at a first and second detector takes place substantially simultaneously so that the operating parameters may be regulated continuously and the first and second detector are preset to determine the same selected harmful substances.

VI. ISSUES ON APPEAL

The issue on appeal is whether the Examiner failed to establish a *prima facie* case that claims 1-13, which stand rejected under 35 U.S.C. § 103(a), are obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.).

VII. GROUPING OF THE CLAIMS

For purposes of this appeal, all claims stand or fall together.

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A. Relevant Legal Standards

To reject claims in an application under 35 U.S.C. § 103(a), an examiner must show an unrebutted *prima facie* case of obviousness. *see In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998). The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated:

> Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Therefore, to sustain a rejection under 35 U.S.C. § 103(a), there must be some teaching, other than the instant application, to alter the prior art and arrive at the claimed invention. To establish obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974). "The problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 679 (Fed. Cir. 1998).

Thus, to establish a *prima facie* case of obviousness, the examiner has an obligation to construe the scope of the prior art, identify the differences between the claims and the prior art, and determine the level of skill in the pertinent art at the time of the invention. From this, the examiner must provide a positive reason why it would be obvious to modify the prior art to arrive at the claimed invention. Absent an explanation of "the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of [applicant's] invention to make the combination, [there is an inference] that the examiner selected these references with the

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"Multiple cited prior art references *must suggest the desirability* of being combined and the reference must be viewed without the benefit of *hindsight* afforded to the disclosure. *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994); *emphasis added.* "It is improper to use the inventor's disclosure as a road map for selecting and combining prior art disclosures." *See Grain Processing Corp. v. American Maize-Products Corp.*, 840 F.2d 902, 907 (Fed. Cir. 1988). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, and not be based on Appellant's disclosure. *See In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

When combining references for purposes of demonstrating obviousness of the claimed invention, the first requirement is that a suggestion, teaching, or motivation to combine the prior art references be shown. *C.R. Bard, Inc. v. M3 Sys. Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This showing is an "essential evidentiary component of an obviousness holding." *Id.*, emphasis added. This evidence may flow from the (1) prior art references themselves, (2) the knowledge of one of ordinary skill in the art, or, in some cases, (3) from the nature of the problem to be solved. *Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000), *citing Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed.Cir. 1996). However, the suggestion more often comes from the teachings of the pertinent references. *See In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998). "This showing must be clear and

particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." *Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000); emphasis added.

B. The Rejection

The sole issue in this Appeal is whether the Examiner failed to establish a *prima facie* case that claims 1-13, which stand rejected under 35 U.S.C. § 103(a), are obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.). It is alleged that Rossin et al. discloses a process for the decomposition of perfluoroalkanes to HF and CO_2 by contacting, in the presence of oxygen, the perfluoroalkanes with a catalyst. The Examiner states that Rossin et al. does not disclose (1) the step of controlling the scrubbing condition by monitoring the amount of harmful substances in the effluent gas before and after the scrubbing step and (2) that the decomposing step is carried out in a combustion chamber having a combustible gas. It is alleged that Kisters et al. discloses a continuous and automatic measurement of the concentration of the components in the gas to adjust the amount of neutralizing agent to be a stoichiometric amount. It is further alleged that the incineration (combustion) method of Tom et al. may be used as a decomposing step in the process of Rossin et al.

However, as stated by the Examiner, Kisters et al. discloses a process and apparatus for the removal by absorption of noxious compounds from waste gases. The present invention is not directed at an absorptive removal of a pollutant, but to a combustion decomposition of multiple process gases of varying content and also post treatment of the combustion by-products. The Examiner states that Kisters et al. is relied on to teach that it is important to monitor the concentration of harmful substances in the exhaust gas to adjust the

amount of neutralizing agent. However, Kisters et al. measures the concentration to simply determine absorptive uptake and adjust a single concentration to provide a stoichiometric reaction with a single waste gas. In contrast, the present invention provides a method for purifying process waste gases where gas analyses of all components may be calculated to determine the types and amounts of selected harmful substances. The present invention then allows adjustment of multiple operating parameters, e.g., the amount of oxygen, the amount of washing agent in the washing agent circuit, the pH of the washing agent, etc., to minimize the amount of a selected harmful substance.

While the waste gas of Kisters et al. come from only one process to allow a stoichiometric amount of neutralizing agent to be determined, the present invention contemplates successively or simultaneously purifying waste gases from a variety of processes. This allows multiple gases of highly variable composition from a plurality of harmful substances to be purified in systems where there is considerable difficulty in determining the necessary method parameters. According to the present invention, the initial operating parameters are determined upon detection by the first detector of at least one selected harmful substance. Many harmful substances may be present and may result from a single, multiple or alternating chemical production or treatment processes, e.g., chemical vapor deposition (CVD), etching processes and/or chamber-cleaning processes. One or more operating parameters may then be adjusted as a function of the measured values of the second detector so that the concentration of harmful substances is minimized. For example, if the second detector measures an elevated concentration of HF then the pH and/or the amount of the washing agent may be increased. On the other hand, if an elevated concentration of combustible/oxidizable or thermally decomposable harmful substance is detected by the second detector, the amount of combustible

gas and/or the amount of oxygen supplied is increased. Neither Rosin et al. nor Kisters et al. teach or suggest using a first and a second detector tailored to identify selected harmful substances in which the detectors provide measuring signals that are used to adjust multiple operating parameters of the system. Therefore, the references taken alone or together do not teach or suggest all the claim limitations of the present invention.

The Examiner further alleges that even though Rossin et al. is a catalytic decomposition process, the incineration (combustion) method of Tom et al. may be used to raise the process temperature by direct heating. Although Tom et al. states that incineration has been shown to be an effective means of destroying halocarbons, it is directed to a process for removing and recovering halocarbons as an alternative to incineration. Indeed, the disclosure of Tom et al. teaches away from the present invention by describing the potential drawbacks of incineration with the purpose of leading a person skilled in the art away from using a combustion method. Tom et al. states that incineration requires considerable capital investment and produces toxic and corrosive hydrogen fluoride that adds to overall cost and complexity of the process. (*see* Tom et al., col. 1, lines 55-67) Tom et al. further states that incineration processes require inconvenient disposal of large volumes of aqueous waste, burning processes that involve safety concerns and is cost-ineffective for dilute concentrations of waste gas. (*see* Tom et al., col. 2, lines 1-5)

To establish obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the teachings. The mere fact that references might be modified is not enough to constitute obviousness unless the prior art also suggests the desirability of the modification. Since the disclosure of Tom et al. would lead a person of ordinary skill

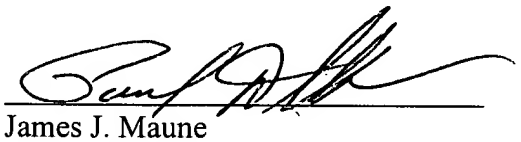
away from replacing the catalytic process of Rossin et al. with incineration, there is no suggestion or motivation to modify or combine the teachings in the references themselves or in the knowledge generally available to one skilled in the art.

Therefore, a *prima facie* case that the claims of the present invention are obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.) has not been established.

IX. CONCLUSION

For the reasons indicated above, Appellant respectfully submits that the invention recited in each of the claims of the present application as provided herein is new and non-obvious. Reversal of the Examiner's rejections of the claims is therefore respectfully requested.

Respectfully submitted,



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APPENDIX TO BRIEF ON APPEAL

The pending claims are as follows:

1. A method for purifying process waste gases containing selected harmful substances comprising:

introducing the process waste gases with combustible gas and oxygen into a waste gas purification system having a combustion chamber, an exit, and operating parameters, including amount of combustible gas and amount of oxygen;

post-treating reaction products leaving the combustion chamber in a sorbtion chamber with an associated washing agent circuit containing washing agent having a selectable pH;

measuring with a first detector the type and amount of selected harmful substances in the process waste gas before said waste gases enter the waste gas purification system to generate first measuring signals;

determining with a second detector the type and amount of selected harmful substances of the reaction products leaving the waste gas purification system at the exit of the purification system to generate second measuring signals; and

directly using the first and second measuring signals for adjusting the operating parameters of the waste gas purification system, including amount of combustible gas, amount of oxygen, amount of washing agent in the washing agent circuit, and pH of the washing agent.

2. The method according to Claim 1, wherein the operating parameters are regulated as a function of the amounts of selected harmful substances in the process waste gas.

3. The method according to Claim 1, wherein upon detection of at least one of the selected harmful substances by the first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to the amount of combustible gas, the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent.

4. The method according to Claim 3, wherein the operating parameters are preset by a self-learning system on the basis of comparatively determined waste gas species and concentrations of harmful substances.

5. The method according to Claim 2, wherein upon detection of at least one of the selected harmful substances by the first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to the amount of combustible gas, the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent.

6. The method according to Claim 5, wherein the operating parameters are preset by a self-learning system on the basis of comparatively determined waste gas species and concentrations of harmful substances.

7. The method according to Claim 1, wherein the operating parameters of the waste gas purification system are adjusted as a function of the measuring signals of the second detector

in such a way that the concentration of selected harmful substances at the exit of the waste gas purification system is regulated to a minimum.

8. The method according to Claim 1, wherein the measuring signals are obtained in a contactless manner.

9. The method according to Claim 1, wherein the measuring signals are obtained by optical spectroscopy.

10. The method according to Claim 1, wherein if an elevated concentration of a selected harmful substance is detected by the second detector then at least one of the pH of the washing agent and the amount of the washing agent is increased.

11. The method according to Claim 1, wherein if elevated concentrations of selected harmful substances are detected by the second detector the amount of combustible gas and/or the amount of oxygen supplied is increased.

12. The method according to Claim 1, wherein the type and amount of harmful substances are substantially simultaneously calculated by a computer in the waste gas purification system on the basis of the measuring signals of the first and second detectors, and the operating parameters of the waste gas purification system are regulated as a function of the amounts of harmful substances measured by the first detector and by the second detector.

13. The method according to Claim 1, wherein the operating parameters are regulated in accordance with the amount of process waste gas supplied.

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Since the composition of process waste gases are generally known when the gases come from only one process, the method parameters can usually be determined by empirical values or stoichiometric calculation. However, when successively or simultaneously purifying process waste gases from a variety of processes or process waste gases of highly variable composition, as in the present invention, considerable difficulties occur in determining the necessary method parameters. According to the present invention, upon detection of at least one selected harmful substance by a first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to, e.g., the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent. In particular, the operating parameters are preset by a self-learning algorithm in the computer on the basis of comparatively determined waste gas species and concentrations of harmful substances. The operating parameters of the waste gas purification system are then

adjusted as a function of the measured values of a second detector so that the concentration of selected harmful substances at the exit of the waste gas purification system is minimized. For example, if the second detector measures an elevated concentration of HF then the pH and/or the amount of the washing agent may be increased. On the other hand, if an elevated concentration of combustible/oxidizable or thermally decomposable harmful substance is detected by the second detector, the amount of combustible gas and/or the amount of oxygen supplied is increased.

Therefore, the present invention provides a method for purifying process waste gases from a variety of processes or from processes containing highly variable composition. Gas analyses of all components of the waste gas are calculated from a spectrum of selected harmful substances and multiple operating parameters may be adjusted accordingly. In addition, measurement at a first and second detector takes place substantially simultaneously so that the operating parameters may be regulated continuously and the first and second detector are preset to determine the same selected harmful substances.

VI. ISSUES ON APPEAL

The issue on appeal is whether the Examiner failed to establish a *prima facie* case that claims 1-13, which stand rejected under 35 U.S.C. § 103(a), are obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.).

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However, as stated by the Examiner, Kisters et al. discloses a process and apparatus for the removal by absorption of noxious compounds from waste gases. The present invention is not directed at an absorptive removal of a pollutant, but to a combustion decomposition of multiple process gases of varying content and also post treatment of the combustion by-products. The Examiner states that Kisters et al. is relied on to teach that it is important to monitor the concentration of harmful substances in the exhaust gas to adjust the

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While the waste gas of Kisters et al. come from only one process to allow a stoichiometric amount of neutralizing agent to be determined, the present invention contemplates successively or simultaneously purifying waste gases from a variety of processes. This allows multiple gases of highly variable composition from a plurality of harmful substances to be purified in systems where there is considerable difficulty in determining the necessary method parameters. According to the present invention, the initial operating parameters are determined upon detection by the first detector of at least one selected harmful substance. Many harmful substances may be present and may result from a single, multiple or alternating chemical production or treatment processes, e.g., chemical vapor deposition (CVD), etching processes and/or chamber-cleaning processes. One or more operating parameters may then be adjusted as a function of the measured values of the second detector so that the concentration of harmful substances is minimized. For example, if the second detector measures an elevated concentration of HF then the pH and/or the amount of the washing agent may be increased. On the other hand, if an elevated concentration of combustible/oxidizable or thermally decomposable harmful substance is detected by the second detector, the amount of combustible

gas and/or the amount of oxygen supplied is increased. Neither Rosin et al. nor Kisters et al. teach or suggest using a first and a second detector tailored to identify selected harmful substances in which the detectors provide measuring signals that are used to adjust multiple operating parameters of the system. Therefore, the references taken alone or together do not teach or suggest all the claim limitations of the present invention.

The Examiner further alleges that even though Rossin et al. is a catalytic decomposition process, the incineration (combustion) method of Tom et al. may be used to raise the process temperature by direct heating. Although Tom et al. states that incineration has been shown to be an effective means of destroying halocarbons, it is directed to a process for removing and recovering halocarbons as an alternative to incineration. Indeed, the disclosure of Tom et al. teaches away from the present invention by describing the potential drawbacks of incineration with the purpose of leading a person skilled in the art away from using a combustion method. Tom et al. states that incineration requires considerable capital investment and produces toxic and corrosive hydrogen fluoride that adds to overall cost and complexity of the process. (*see* Tom et al., col. 1, lines 55-67) Tom et al. further states that incineration processes require inconvenient disposal of large volumes of aqueous waste, burning processes that involve safety concerns and is cost-ineffective for dilute concentrations of waste gas. (*see* Tom et al., col. 2, lines 1-5)

To establish obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the teachings. The mere fact that references might be modified is not enough to constitute obviousness unless the prior art also suggests the desirability of the modification. Since the disclosure of Tom et al. would lead a person of ordinary skill

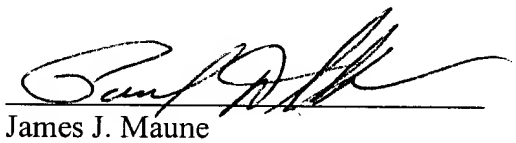
away from replacing the catalytic process of Rossin et al. with incineration, there is no suggestion or motivation to modify or combine the teachings in the references themselves or in the knowledge generally available to one skilled in the art.

Therefore, a *prima facie* case that the claims of the present invention are obvious in view of U.S. Patent No. 6,069,291 (Rossin et al.) further in view of U.S. Patent No. 4,229,411 (Kisters et al.) and U.S. Patent No. 6,030,591 (Tom et al.) has not been established.

IX. CONCLUSION

For the reasons indicated above, Appellant respectfully submits that the invention recited in each of the claims of the present application as provided herein is new and non-obvious. Reversal of the Examiner's rejections of the claims is therefore respectfully requested.

Respectfully submitted,



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APPENDIX TO BRIEF ON APPEAL

The pending claims are as follows:

1. A method for purifying process waste gases containing selected harmful substances comprising:

introducing the process waste gases with combustible gas and oxygen into a waste gas purification system having a combustion chamber, an exit, and operating parameters, including amount of combustible gas and amount of oxygen;

post-treating reaction products leaving the combustion chamber in a sorbtion chamber with an associated washing agent circuit containing washing agent having a selectable pH;

measuring with a first detector the type and amount of selected harmful substances in the process waste gas before said waste gases enter the waste gas purification system to generate first measuring signals;

determining with a second detector the type and amount of selected harmful substances of the reaction products leaving the waste gas purification system at the exit of the purification system to generate second measuring signals; and

directly using the first and second measuring signals for adjusting the operating parameters of the waste gas purification system, including amount of combustible gas, amount of oxygen, amount of washing agent in the washing agent circuit, and pH of the washing agent.

2. The method according to Claim 1, wherein the operating parameters are regulated as a function of the amounts of selected harmful substances in the process waste gas.

3. The method according to Claim 1, wherein upon detection of at least one of the selected harmful substances by the first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to the amount of combustible gas, the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent.

4. The method according to Claim 3, wherein the operating parameters are preset by a self-learning system on the basis of comparatively determined waste gas species and concentrations of harmful substances.

5. The method according to Claim 2, wherein upon detection of at least one of the selected harmful substances by the first detector, the operating parameters of the waste gas purification system are preset with empirical values with reference to the amount of combustible gas, the amount of oxygen, the amount of washing agent in the washing agent circuit, and the pH of the washing agent.

6. The method according to Claim 5, wherein the operating parameters are preset by a self-learning system on the basis of comparatively determined waste gas species and concentrations of harmful substances.

7. The method according to Claim 1, wherein the operating parameters of the waste gas purification system are adjusted as a function of the measuring signals of the second detector

in such a way that the concentration of selected harmful substances at the exit of the waste gas purification system is regulated to a minimum.

8. The method according to Claim 1, wherein the measuring signals are obtained in a contactless manner.

9. The method according to Claim 1, wherein the measuring signals are obtained by optical spectroscopy.

10. The method according to Claim 1, wherein if an elevated concentration of a selected harmful substance is detected by the second detector then at least one of the pH of the washing agent and the amount of the washing agent is increased.

11. The method according to Claim 1, wherein if elevated concentrations of selected harmful substances are detected by the second detector the amount of combustible gas and/or the amount of oxygen supplied is increased.

12. The method according to Claim 1, wherein the type and amount of harmful substances are substantially simultaneously calculated by a computer in the waste gas purification system on the basis of the measuring signals of the first and second detectors, and the operating parameters of the waste gas purification system are regulated as a function of the amounts of harmful substances measured by the first detector and by the second detector.

13. The method according to Claim 1, wherein the operating parameters are regulated in accordance with the amount of process waste gas supplied.